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10/527,809

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Hiroshi Ichikawa

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EXAMINER

MCGUTHRY BANKS, TIMA MICHELE

ART UNIT

PAPER NUMBER

1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|---|--|--|
| Office Action Summary | Application No. 10/527,809 | Applicant(s) ICHIKAWA ET AL. | |
| | Examiner TIMA M. MCGUTHRY-BANKS | Art Unit 1793 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-33,35,37,38 and 41-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 37,38,41 and 42 is/are allowed.
- 6) ☒ Claim(s) 26-33,35,43 and 44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

Claims 26, 27, 37 and 38 are currently amended, Claims 28-33, 35 and 41-43 are as previously presented, Claims 34, 36, 39 and 40 are cancelled and Claim 44 is new.

Response to Arguments

Applicant's arguments with respect to claims 26-33, 35, 37, 38 and 41-43 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 26-30, 35, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 50101202 A, based on English written translation in view of Yasukawa et al (US 4,525,208) and JP 2001-033173 A (abstract and machine translation).

JP '02 teaches a method for recovering valuable metal such as zinc, lead, cadmium and iron from open-arc furnace steelmaking dust (page 1, paragraph 1). The dust is washed with water to remove chlorine, sodium and potassium, and any elution of

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valuable metal such as zinc, etc. has to be inhibited as much as possible. The pH is adjusted to 7-12 (page 4, final paragraph), which overlaps the claimed range. The dust composition is as follows (page 2, final paragraph):

1-5% sodium
0.5-2% potassium
20% or more zinc
1-10% lead

The ratio of the total amount of sodium and potassium (1.5-7%) to the total amount of zinc and lead (21% or more) overlaps the claimed range. The water-washed dust is dried (page 5, second paragraph). The resulting dust is steelmaking raw material (page 6, paragraph 2). Further regarding Claim 27, dried material is mixed with cokes and return ore (page 5, paragraph 2). Regarding Claim 28, JP '202 teaches the claimed range. Regarding Claim 29, the ratio of dust to water by weight is 1-5 or higher (page 4, final paragraph); that the material is dried reads on the claimed range. Regarding Claim 30, the water temperature is 50-60 °C (page 5, first paragraph). Regarding agitation, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use agitation in the process of JP '202, since agitation increases surface area contact. Regarding Claim 35, open arc furnaces are used to process steel; therefore the dust is steelmaking waste. Regarding Claim 44, the elution of valuable metals is practically zero (page 5, first paragraph). However, JP '202 does not teach that the zinc, lead or iron is in the form of oxides, charging the dried material to a rotary hearth reduction furnace or a waste heat boiler as in Claims 26 27.

Regarding zinc, lead or iron in the form of oxides, Yasukawa et al teaches that iron and steel dust that occurs from an open-arc furnace contains iron oxide (column 1,

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lines 12-14). It would have been obvious to one of ordinary skill in the art at the time the invention was made that the dust in JP '202 would also contain iron oxide, since both Yasukawa et al and JP '202 teach the same kind of dust.

Regarding the rotary hearth reduction furnace, Yasukawa et al teaches treating open-arc furnace dust in either powder or pelletized form in a rotary hearth furnace (column 3, lines 6-20). Regarding Claim 43, exhaust gas is treated to recover zinc and lead (lines 2-4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a rotary hearth furnace to recovery the metals in the dust of JP '202, since Yasukawa et al teaches a high ratio of volatilization of zinc and lead (column 2, lines 9-11).

Regarding the waste heat boiler, JP '173 teaches an exhaust gas treating facility for a rotary hearth furnace with a waste heat boiler (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the waste heat boiler of JP '173 with the process of JP '202 in view of Yasukawa et al, since JP '173 teaches preventing the closing of an exhaust gas route, a corrosion of a wall due to volatile impurities, acid corrosion and a burning damage of a filter, efficiently cooling and dust correcting the exhaust gas and recovering a waste heat (abstract).

Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '202 in view of Yasukawa et al and JP '173 as applied to claims 26 or 27 above, and further in view of Ibaraki et al (US 6,755,888).

JP '202 in view of Yasukawa et al and JP '173 discloses the invention substantially as claimed. However, JP '202 in view of Yasukawa et al and JP '173 does not disclose shaping the dehydrated material into shaped articles having a porosity of at least 35% as in Claims 31-33. Ibaraki et al teaches reducing a metal oxide with a rotary hearth by shaping the powder containing the metal oxide and using a moisture content of 15-30% (column 5, line 35-42). Regarding Claim 31, the powder filling rate is 0.65-0.75 (column 9, lines 29 and 30), which reads on a porosity of at least 35%. Regarding Claim 32, Ibaraki et al teaches the claimed range. Regarding Claim 33, Ibaraki teaches that the amount of fixed carbon contained in the shaped articles is 1.5 times or less than the molar number of fixed carbon figured out on the assumption that it reacts with oxygen combined with iron oxide to produce carbon monoxide (column 12, lines 39-42). An example of furnace temperature is 1210 °C and the time is 15 minutes (column 15, lines 41-44). It would have been obvious to one of ordinary skill in the art at the time the invention was made that Ibaraki et al reads on the claimed ratio of molar oxygen and carbon, since a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation; therefore a *prima facie* case of obviousness exists. See MPEP § 2144.05 II B. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder filling rate, moisture content and amount of fixed carbon as taught by Ibaraki et al in the process of JP '202 in view of Yasukawa et al and JP '173, since Ibaraki et al teaches a process free from explosive-cracking of

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shaped articles of raw materials, low construction costs, low operation costs and savings in energy consumption (column 17, lines 33-40).

Allowable Subject Matter

Claims 37, 38, 41 and 42 are allowed.

Claim 44 would be allowable if amended to depend only on Claims 37 and 38.

The following is a statement of reasons for the indication of allowable subject matter: JP '202 does not teach adding a pH adjustor in the form of a substance containing OH-groups or a fly ash. JP '202 teaches using sulfuric acid (page 4, final paragraph).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIMA M. MCGUTHRY-BANKS whose telephone number is (571)272-2744. The examiner can normally be reached on M-F 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George Wyszomierski/
Primary Examiner
Art Unit 1793

/T. M. M./
Examiner, Art Unit 1793
4 December 2009